

Trend Study 25A-11-99

Study site name: Forsyth Reservoir .

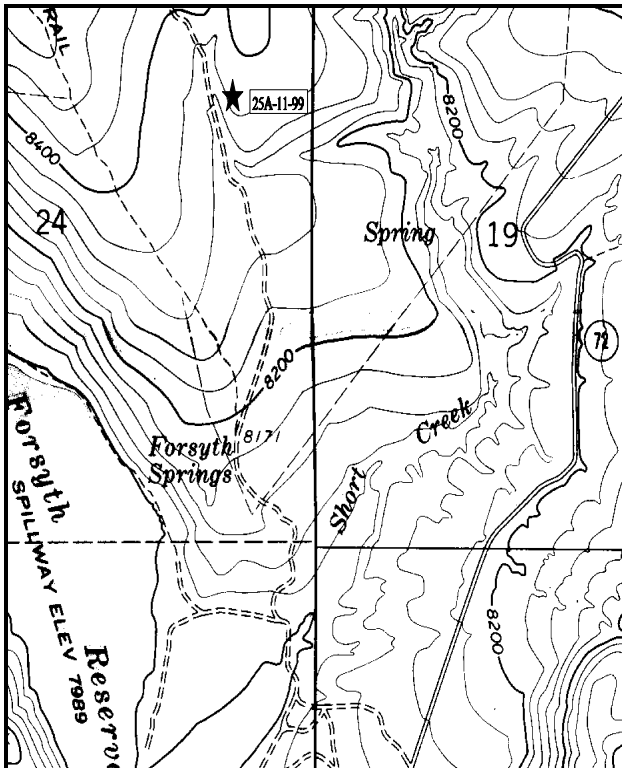
Range type: Black Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

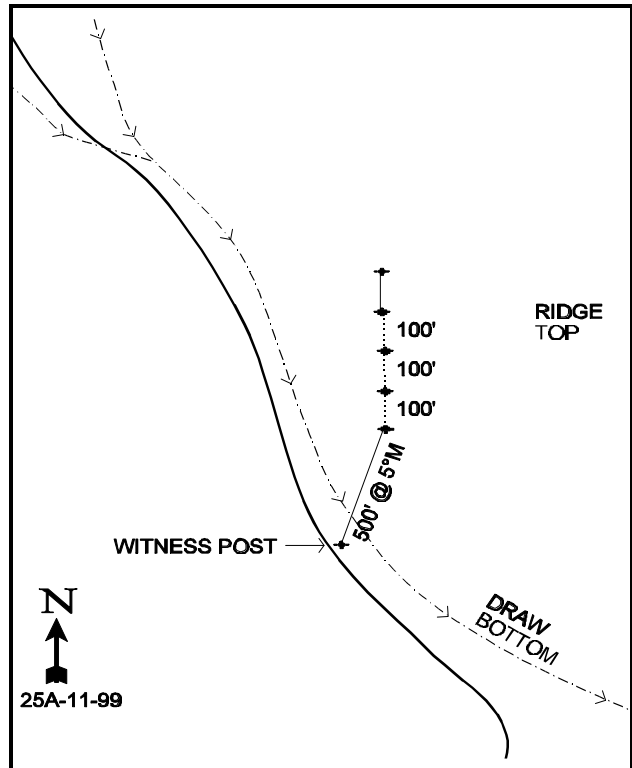
LOCATION DESCRIPTION

Between Lyman and Loa, turn north towards Fremont to connect with SR 72. Travel up SR 72 until you cross a Forest Service boundary cattleguard (about 5 miles from Fremont). Continue another 2.7 miles to Forsyth Reservoir. Turn at the Forsyth Reservoir sign and drive down 0.3 miles to a fork. Turn right and continue 0.1 miles to where the road crosses Short Creek (which empties into the east cove of Forsyth). From Short Creek, go up 0.1 miles to a fork. Turn right and go 0.25 miles to a cattleguard. Continue 0.15 miles beyond the cattleguard to a fork. Take the right fork and go 0.55 miles to a draw below a ridge to the northeast. There is a steel rebar witness post on the right side of the road. The last baseline stake is located 500 feet away at a bearing of 5°M on top of the ridge. The 0-foot baseline stake is 400 feet due north, and has a red browse tag #7062 attached.



Map Name: Forsyth Reservoir, Utah

Township 26S , Range 3E , Section 24



Diagrammatic Sketch

UTM 4265581.540 N, 454183.784 E

DISCUSSION

Trend Study No. 25A-11 (44-5)

The Forsyth Reservoir study site transect is located on the top of a hill north of Forsyth Reservoir. The slope is 5% with a south-southwest aspect and an elevation of 8,400 feet. The area is managed by the Fish Lake National Forest as part of the Tidwell cattle allotment. Historically, the area has received heavy grazing by cattle and sheep, but with an especially high impact within the vicinity of the reservoir. A large area was sprayed with 2,4-D in the spring of 1976 to reduce shrub competition and release the grasses and forbs. A drought after the spraying impaired growth, but five years after the spraying it was noted by Forest Service personnel that there was fair grass production with good vigor. The study site is currently dominated by black sagebrush. The area is still used by cattle every other year in early June, and is used by deer and elk in the winter. Pellet group data from 1999 estimate 2 deer, 60 elk, and 7 cow days use/acre (5 ddu/ha, 148 edu/ha, 17 cdu/ha). Cattle pats and about 70% of the elk pellet groups were from this spring ('99).

Soil on the site is moderately deep with an effective rooting depth estimated at just over 14 inches. Texture is a clay loam with a neutral pH (7.0). Phosphorus is low at only 2.6 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock and pavement cover are relatively high on the surface and the profile contains abundant gravel. Litter cover is limited, but percent bare soil is low ranging from 1 to 4% since 1985. The soil appears to absorb and hold water well and the layer of pavement effectively stops erosion.

The dominant browse on the site is black sagebrush which currently ('99) provides 91% of the total browse cover. It has an extremely high density ranging from 15,466 plants/acre in 1985 to 28,180 by 1999. Use of the black sagebrush has been light to moderate with each reading and vigor has remained good. Percent decadence has steadily increased from 9% in 1985 to 29% in 1999. Many of the decadent plants encountered in 1999 were young plants with partial crown death likely due to drought and winter injury, combined with intraspecific competition. The current density appears to be near the maximum for this site. There are some scattered mountain big sagebrush plants on the site, which are more heavily hedged.

Other common shrubs found on the site include fringed sage and stickyleaf low rabbitbrush. Density of fringed sage and stickyleaf low rabbitbrush declined considerable between 1991 and 1999, but most of the change is due to the much larger sample used in 1999. These low growing shrubs show light use and good vigor.

The herbaceous understory is diverse yet not particularly abundant considering the treatment. Grasses currently ('99) produce only 7% cover, while forbs provide only 1%. The dominant grass is the warm season blue grama which provides 36% of the grass cover. Mutton bluegrass and letterman needlegrass are also fairly abundant. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

1985 APPARENT TREND ASSESSMENT

The soil appeared stable. Spraying has made this a dynamic vegetative community with many changes occurring. Grasses, as well as the key species black sage, are doing well and increasing. The Forest Service has recommendations to re-spray the sagebrush by 1990. However, additional seeding and further restrictions on cattle grazing may be necessary in order to improve the site for cool season herbaceous species and spring use by wildlife and cattle.

1991 TREND ASSESSMENT

The soil is still stable, with only 1% bare ground at this time. Fringed sagebrush and stickyleaf low

rabbitbrush have increased in density. The key species, black sagebrush, also increased in density by 27%. The herbaceous understory has remained about the same, with few changes.

TREND ASSESSMENT

soil - stable

browse - improving

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is still considered stable even with the slight increase in bare soil, as it is still very low at only about 4%. The soil surface is still covered with pavement which provides adequate protection and erosion is not currently a problem. Trend for browse is stable for the key species, black sagebrush. Some of the changes in density of shrubs between 1991 and 1999 is the result of the larger sample used in 1999. Black sagebrush displays light to moderate use, good vigor, and excellent recruitment. The population currently appears to be at the maximum for the site. The dramatic decline in density of fringed sagebrush and stickleaf low rabbitbrush also appears to be the result of the larger sample used this year which gives a more representative sample of shrub populations with discontinuous distributions. Trend for the herbaceous understory is down slightly. Sum of nested frequency for perennial grasses has declined slightly, while frequency of perennial forbs has dropped considerably. Sum of nested frequency for blue grama declined slightly with frequency of bottlebrush squirreltail declining significantly. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 11

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron trachycaulum	14	4	9	7	2	4	.04
G	Bouteloua gracilis	_a 140	_b 184	_{ab} 166	64	74	67	2.44
G	Carex spp.	_a 6	_a 6	_b 33	3	2	14	.14
G	Poa fendleriana	102	113	120	49	47	56	2.00
G	Sitanion hystrix	_b 156	_b 161	_a 85	63	66	36	.66
G	Stipa comata	_a 1	_a -	_b 35	1	-	14	.37
G	Stipa lettermani	102	102	85	42	42	41	1.14
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		521	570	533	229	233	232	6.82
Total for Grasses		521	570	533	229	233	232	6.82
F	Androsace septentrionalis (a)	-	-	3	-	-	2	.03
F	Arabis demissa	_c 143	_b 74	_a 25	61	36	11	.05
F	Astragalus lentiginosus	3	-	-	1	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Chaenactis douglasii	_a 2	_b 14	_a 3	1	8	1	.00
F	Erigeron pumilus	_c 137	_b 110	_a 66	58	49	29	.19
F	Hymenoxys richardsonii	_a 1	_a -	_b 17	1	-	9	.70
F	Pedicularis centranthera	-	-	1	-	-	1	.00
F	Penstemon spp.	_a -	_{ab} 1	_b 9	-	1	4	.02
F	Phlox austromontana	-	-	2	-	-	2	.01
F	Phlox longifolia	_b 60	_{ab} 33	_a 19	27	16	11	.05
F	Senecio multilobatus	_a -	_{ab} 3	_b 10	-	2	5	.02
Total for Annual Forbs		0	0	3	0	0	2	0.03
Total for Perennial Forbs		346	235	152	149	112	73	1.07
Total for Forbs		346	235	155	149	112	75	1.11

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 11

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	31	.16
B	Artemisia nova	96	19.44
B	Artemisia tridentata vaseyana	2	-
B	Chrysothamnus nauseosus	1	-
B	Chrysothamnus viscidiflorus viscidiflorus	29	1.60
B	Cowania mexicana stansburiana	0	-
B	Coryphantha vivipara arizonica	2	.06
B	Eriogonum microthecum	9	.03
B	Gutierrezia sarothrae	4	.01
B	Leptodactylon pungens	2	-
B	Pediocactus simpsonii	2	.03
B	Pinus edulis	1	-
B	Tetradymia canescens	1	-
Total for Browse		180	21.35

BASIC COVER --

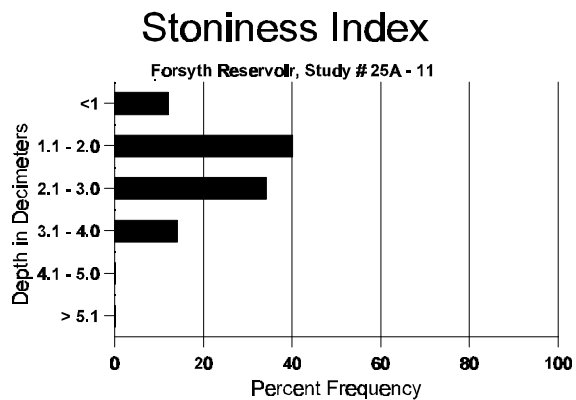
Herd unit 25A, Study no: 11

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	321	5.75	10.75	32.02
Rock	313	6.25	2.75	14.71
Pavement	361	49.50	57.00	38.54
Litter	285	32.00	27.75	7.75
Cryptogams	169	4.75	.75	1.71
Bare Ground	177	1.75	1.00	3.56

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 11, Study Name: Forsyth Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.4	53.8 (15.6)	7.0	41.3	35.4	23.3	2.2	2.6	89.6	0.5



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 11

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	6	n/a
Elk	19	60(148)
Deer	5	2(5)
Cattle	2	7(17)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 11

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	85	73	-	-	-	-	-	-	-	-	73	-	-	-	4866		73
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	85	208	-	-	-	-	-	-	-	-	208	-	-	-	13866		208
	91	38	11	-	-	-	-	-	-	-	49	-	-	-	3266		49
	99	13	1	-	-	-	-	-	-	-	14	-	-	-	280		14
M	85	140	-	-	-	-	-	-	-	-	140	-	-	-	9333	2 4	140
	91	100	72	36	24	1	-	1	-	-	234	-	-	-	15600	2 3	234
	99	85	8	-	5	-	-	-	-	-	98	-	-	-	1960	4 6	98
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	10	7	6	-	-	-	-	-	-	21	-	-	2	1533		23
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>			
'85		00%				00%				00%				-12%			
'91		30%				14%				.65%				-89%			
'99		08%				00%				00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	23199	Dec:	0%		
												'91	20399		8%		
												'99	2240		0%		
Artemisia nova																	
S	85	142	-	-	-	-	-	-	-	-	142	-	-	-	9466		142
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	85	85	1	-	-	-	-	-	-	-	86	-	-	-	5733		86
	91	116	19	3	5	-	-	15	-	-	157	-	1	-	10533		158
	99	271	109	2	-	-	-	-	-	-	382	-	-	-	7640		382
M	85	95	27	3	-	-	-	-	-	-	125	-	-	-	8333	7 10	125
	91	38	19	18	40	2	-	-	-	-	102	15	-	-	7800	6 11	117
	99	379	215	-	-	18	-	-	-	-	612	-	-	-	12240	7 16	612
D	85	5	15	1	-	-	-	-	-	-	20	-	-	1	1400		21
	91	23	6	2	11	-	-	-	-	-	27	1	-	14	2800		42
	99	228	128	3	-	52	4	-	-	-	384	-	-	31	8300		415
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	720		36
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>			
'85		19%				02%				.43%				+27%			
'91		15%				07%				05%				+25%			
'99		37%				.63%				02%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	15466	Dec:	9%		
												'91	21133		13%		
												'99	28180		29%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	1	1	-	-	-	-	-	-	-	2	-	-	40	11	25	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			50%			50%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Chrysanthamnus nauseosus																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	2	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	1	-	-	-	-	-	-	-	1	-	-	20	7	9	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			100%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	0		-			
												'99	20		-			
Chrysanthamnus viscidiflorus viscidiflorus																		
S	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800			12
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	43	-	-	-	-	-	-	-	-	43	-	-	-	2866			43
	91	17	8	2	1	-	-	3	-	-	31	-	-	-	2066			31
	99	4	-	1	-	-	-	-	-	-	5	-	-	-	100			5
M	85	130	-	-	-	-	-	-	-	-	129	-	1	-	8666	7	8	130
	91	80	23	8	1	-	-	3	-	-	109	2	2	2	7666	3	4	115
	99	84	2	-	-	-	-	-	-	-	86	-	-	-	1720	6	11	86
D	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	22	3	6	2	-	-	-	-	-	29	1	1	2	2200			33
	99	4	-	-	-	-	-	-	-	-	2	-	-	2	80			4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			.56%			+ 2%							
		'91			19%			09%			-84%							
		'99			02%			01%			02%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	11732	Dec:	2%			
												'91	11932		18%			
												'99	1900		4%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Cowania mexicana stansburiana																	
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	0		-		
Coryphantha vivipara arizonica																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	1	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	120		-		
Eriogonum microthecum																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	1	-	-	-	-	-	-	-	1	1	-	-	133		2
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	6	1	-	-	-	-	-	-	-	7	-	-	-	140	5	7
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	2	-	-	-	-	-	-	-	-	-	-	2	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+67%						
'91		33%			00%			00%			+10%						
'99		36%			00%			18%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	0%		
												'91	199		33%		
												'99	220		18%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	7	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85	00%			00%			00%									
		'91	00%			00%			00%									
		'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	80		-			
Leptodactylon pungens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	9	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85	00%			00%			00%									
		'91	00%			00%			00%									
		'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	120		-			
Pediocactus simpsonii																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	3	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85	00%			00%			00%									
		'91	00%			00%			00%									
		'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	20		-		
Tetradymia canescens																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7 10	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	20		-		